

RED MUD POND LINING AND CAPACITY AUGMENTATION PROJECT AT TIKRI UTKAL ALUMINA

TIKRI UTKAL



RED MUD POND LINING AND CAPACITY AUGMENTATION

TYPE OF PROJECT
Lining Systems - Capping

YEAR OF CONSTRUCTION
2016

CLIENT
Utkal Alumina International
Limited, Tikiri

CONTRACTOR
MYTHRI CONSTRUCTION
COMPANY PVT. LTD.

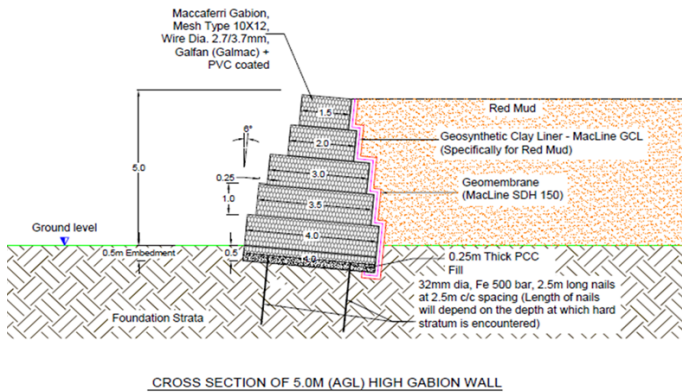
DESIGNER
Indian Institute Of Science,
Bangalore

PROD. RELATED

GCL (MacLine GCL 18800 Sqm), Polymeric Geomembranes (MacLine SDH 18800 Sqm), Gabions (Gabion (Zn+10%Al+PVC) - 29610 Cum)

Challenge

NCRMP (National Cyclone Risk Mitigation Project) project of "Raising & Strengthening of existing saline embankment at Kendrapara district in Orissa" comes under AUL embankment Division of Orissa. Total 11.0 Km stretch is started from Km 8.050 to 19.050 km. In between this 11 Km Embankment there is a stretch from 14.0 Km to 15.0 Km which has already been washed away due to heavy erosion & to be constructed by using Geotextile Tube in 4 tires named as "Pentha project". Details are shown in the figure below of the existing Embankment of the rest 10.0 Km stretch which is to be raised & strengthen.



Cross section of 5m (AGL) high Gabion wall



CONSTRUCTION OF GABION WALL ALONG WITH

Solution

In order to augment capacity of the red mud pond to a large extent, construction of a retaining wall above was suggested. Conventional retaining wall solutions like RCC wall would result into heavy damage over the period of time when in contact of the degrading Red Mud material. The reinforcement used in construction of RCC wall was deemed to get rusted and there will be a chance for the loss of overall strength of the structure. Utkal Alumina Industries took assistance from Maccaferri to overcome the above challenges.

The Maccaferri Environmental solutions Pvt. Ltd. has proposed gabion retaining wall along with the lining solution using geosynthetics on the west, East and South sides of the pond- A. The total stretch length of the work is 1.8 kms. Gabion retaining wall of 5.5 maximum height is suggested. Gabion boxes used were of 3x1x1, 2x1x1, 1.5x1x1 (LxWXH) and made up of Zn+ PVC+ 10 % Al. Composite liner system consisting of Geosynthetic clay liner (MacLine GCL) and Geomembrane (MacLine SDH 150) was proposed in order to ensure red mud slurry containment. Cross section of the solution proposed is given in figure 1 below.

These MacLine GCL is composed of a layer of bentonite encapsulated between two nonwoven polypropylene needle punched geotextiles, needle punched together and laminated on one side to a thin flexible polyethylene membrane. MacLine SDH 150 are produced with high density polyethylene geomembrane manufactured from high quality polyethylene resins. It contains not less than 97% of pure polyethylene polymer and not more than 3% of carbon black, antioxidants and thermal stabilizers.

Benefits of the MacLine SDH 150 and MacLine GCL:

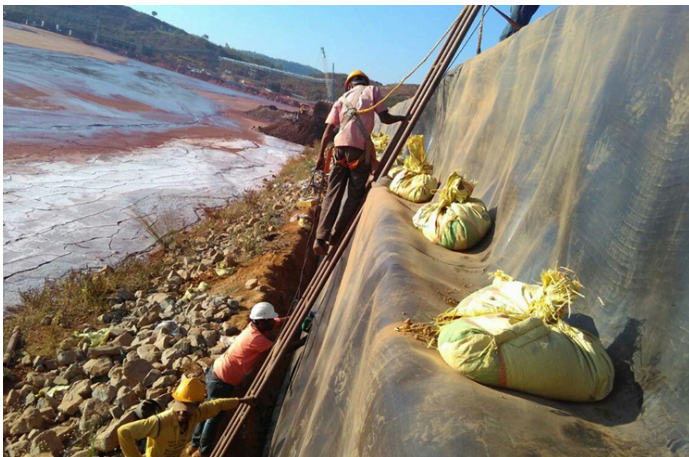
- The advantages of the proposed solutions are that it can be installed in quick time with exact placement of geosynthetic products.
- GCL allows less passage of water being impermeable
- The geomembrane & GCL will effectively confines the red mud slurry material and prevents the seepage flow of the red mud slurry from the walls of the gabion wall.

Advantages of Gabion wall:

- Ease of construction
- Durability
- Flexibility



PHOTOGRAPH SHOWING GCL INSTALLATION OVER THE



PHOTOGRAPH SHOWING GEOMEMBRANE INSTALLATION



PHOTOGRAPH SHOWING THE COMPLETE INSTALLATION ON THE BOUNDARY LOCATION OF THE POND



OPEN GOOGLE MAPS



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